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**METHODS OF FORMING ALPHA AND BETA TANTALUM FILMS
WITH CONTROLLED AND NEW MICROSTRUCTURES**

ABSTRACT OF THE INVENTION

Thin tantalum films having novel microstructures are provided.

The films have microstructures such as nanocrystalline, single crystal and
10 amorphous. These films provide excellent diffusion barrier properties and are
useful in microelectronic devices. Methods of forming the films using pulsed
laser deposition (PLD) and molecular beam epitaxy (MBE) deposition methods
are also provided, as are microelectronic devices incorporating these films.